

Work Order ID 55295

January 13, 2010 9:15:59 AM



Page 1

Item ID: D350-748-141TRN

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Turning Detail

Start Date: 1/13/10 Start Qty: 1.00

Cust Item ID:

Required Date: 1/20/10 Req'd Qty: 1.00

Customer:

Reference:

Run Start



Approvals: Process Plan: *PS*

Date: 10-1-13

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Draw
Number

Draw
Rev.

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D350-748-141

Rev E

100

0.00



MORI SEIKI CNC LATHE LARGE

Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs on both ends as per Folio FA648
2-Turn first side as per Folio FA648
3- File transition lines smooth.

a.n 10 - 02 - 06

110

QC1- Inspect dimensions to dimension sheet

0.00



QC

Memo

0.00

Quality Control

a.n 10 - 02 - 06

120

MORI SEIKI CNC LATHE LARGE

0.00



Mori Seiki

Memo

0.00

Mori Seiki CNC Lathe Large

1-Turn second side as per Folio FA648
2- File transition lines smooth.
3-Scribe Part & Batch as per Dwg D350-748-141

a.n 10 - 02 - 06

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130 	QC1- Inspect dimensions to dimension sheet	0.00							
QC Quality Control	Memo	0.00				0.1	10	02	060
140 	QC8- Inspect parts - second check	0.00							
QC Quality Control	Memo	0.00				1	-	-	APM 10-2-10
150 	Large Fab	0.00							
Large Fab Large Fab	Memo Grind machining marks	0.00				1.4	20	10	0017

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Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
160 	Outsource process - Heat Treat	0.00							
Outsource1	Memo	0.00							
Outsource process - Heat Treat	Issue P/O: <u>11869</u> Heat Treat to min 180 KSI As per Dwg D350-748-141 (MIL-T-6736 OR AMS 2759-1C) Sand Blast tube after Heat Treat Possible Supplier: Vac Aero Ensure Certificate of Conformity is attached								
170 	Receive & Inspect for Damage & Mat'l Certs	0.00							
Packaging	Memo	0.00							
Packaging	Ensure certificate of conformaty is attached								
180 	QC6- Inspect dimensions to drawing	0.00							
QC	Memo	0.00							
Quality Control									

CL 10/5/11 ①

P 01/10/20 ②

④

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Customer:

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run HoursDraw
NumberDraw
Rev.Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

190

0.00



Packaging

Packaging

Memo

0.00

Packaging

Identify and stock in kanban rack
Location: *x-tubes**DP**10-5-27**(1)*

200

0.00



QC

QC21- Final Inspection - Work Order Release

Memo

0.00

Quality Control

*10/05/28**mf*
10-5-27

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Picklist Print

January 13, 2010 9:16:03 AM

Page 1

Work Order ID: 55295



Parent Item: D350-748-141TRN



Parent Item Name: Crosstube Turning Detail

Start Date: 1/13/10

Required Date: 1/20/10

Comments: IPP Rev:A New Issue 08-03-06 DD verified by:ec
IPP Rev B Removed polish 08.04.02 EC verified by : DD
IPP Rev C Remove LPS-3 08.06.23 EC verified by DD

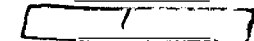
Start Qty: 1.00

Required Qty: 1.00

Component Item ID/	Replacement	Mfg/	Bin	Primary	Last	Route	Unit of	Qty on	Remaining	Qty	Date	Status
D6017-115		Manufactured	No			110	Each	34.0000	1.0000			
Crosstube Material												

A-X 10-02-06 0

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
LG	34	
32912	34	



W/O:		WORK ORDER CHANGES					
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DART AEROSPACE LTD	Work Order:	55295
Description: Crosstube Assembly (AS350/355 High Fwd)	Part Number:	D350-748-141
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.240	/		
	2.180	+0.005/-0.000	2.183	/		
	2.180	+0.005/-0.000	2.183	/		
	2.237	+0.005/-0.000	2.240	/		
	2.272	+0.005/-0.000	2.277	/		
	2.306	+0.005/-0.000	2.310	/		
	2.339	+0.005/-0.000	2.339	/		
	2.339	+0.005/-0.000	2.339	/		
	0.062	+/-0.010	0.062	/		
	4.26	+/-0.030	4.260	/		
	R0.063	+/-0.010	R0.063	/		
	R0.50	+/-0.030	R0.500	/		
SIDE B	2.240	+0.005/-0.000	2.240	/		
	2.180	+0.005/-0.000	2.183	/		
	2.180	+0.005/-0.000	2.183	/		
	2.237	+0.005/-0.000	2.240	/		
	2.272	+0.005/-0.000	2.277	/		
	2.306	+0.005/-0.000	2.310	/		
	2.339	+0.005/-0.000	2.339	/		
	2.339	+0.005/-0.000	2.332	/		
	0.062	+/-0.010	0.062	/		
	4.26	+/-0.030	4.260	/		
	R0.063	+/-0.010	R0.063	/		
	R0.50	+/-0.030	R0.500	/		
	110.27	+/-0.060	110.270	/		

Measured by:	am	Audited by:	ALM	Prototype Approval:	N/A
Date:	10.02.06	Date:	10-2-10	Date:	N/A

Rev	Date	Change	Revised by	Approved
A	06.11.09	New Issue (P/O D350-748-101)	KJ/JLM	
B	07.10.24	Dwg Rev updated	KJ/EC/DD	

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Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6017-115	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 35295
BJ10-1-13

RELEASED
2009-10-29
MB

E	REVISE GENERAL NOTES: UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>Q</i>	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>Q</i>	DRAWING NO.	REV. E
MFG. APPR.	<i>Q</i>	D350-748-141	SHEET 1 OF 4
APPROVED	<i>MB</i>	TITLE	SCALE
DE APPR.	<i>MB</i>	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

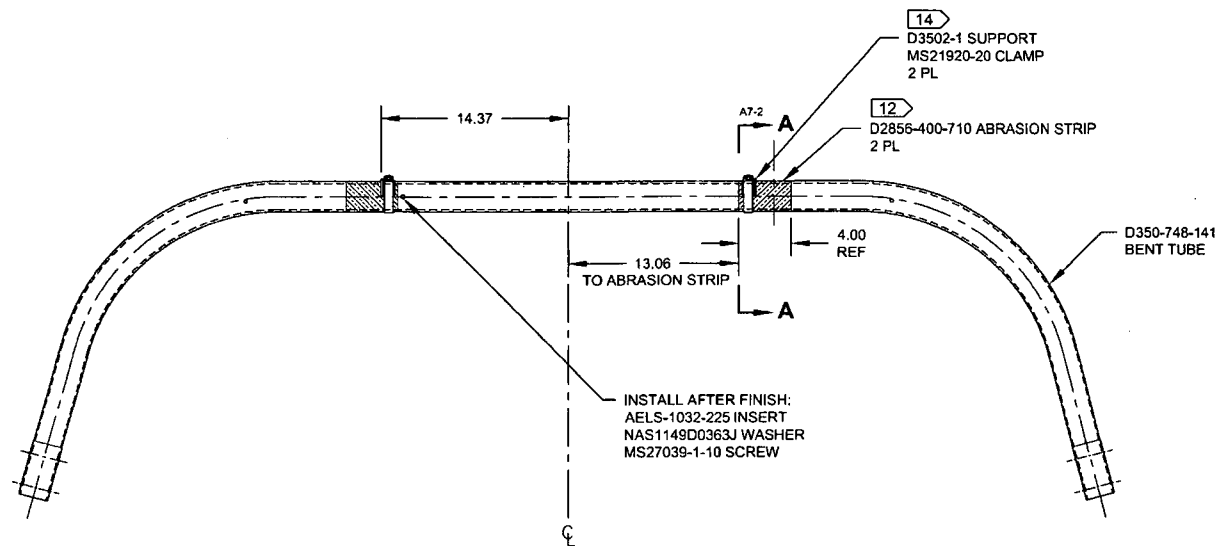
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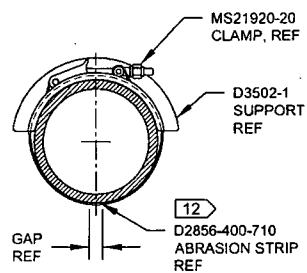
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**D350-748-141
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 4X

RELEASED
2009-10-29

DESIGN	97	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	97	DRAWING NO.	REV. E
MFG. APPR.	12	D350-748-141	SHEET 2 OF 4
APPROVED	12	TITLE	SCALE
DE APPR.	12	CROSSTUBE (AS 350/355 HI FWD)	NTS
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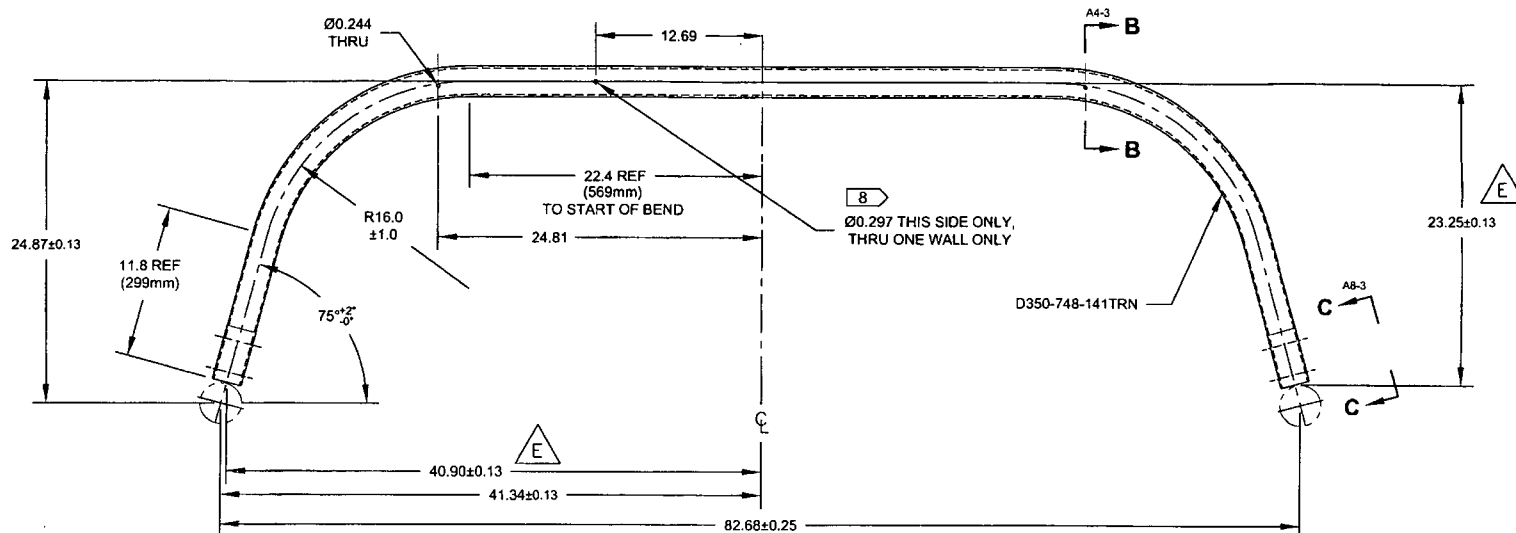
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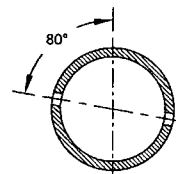
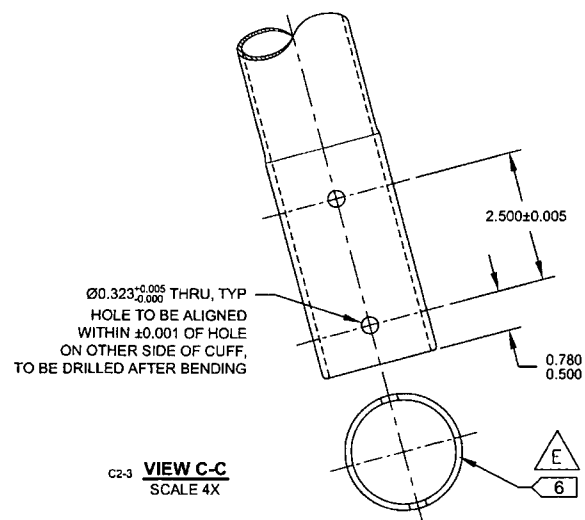
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D350-748-141
BENDING AND DRILLING DETAIL 10



SECTION B-B D3-3
 SCALE 4X

RELEASED
 2009-10-29

W/O 55295

DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. E
MFG. APPR.	RF	D350-748-141	SHEET 3 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (AS 350/355 HI FWD)	NTS
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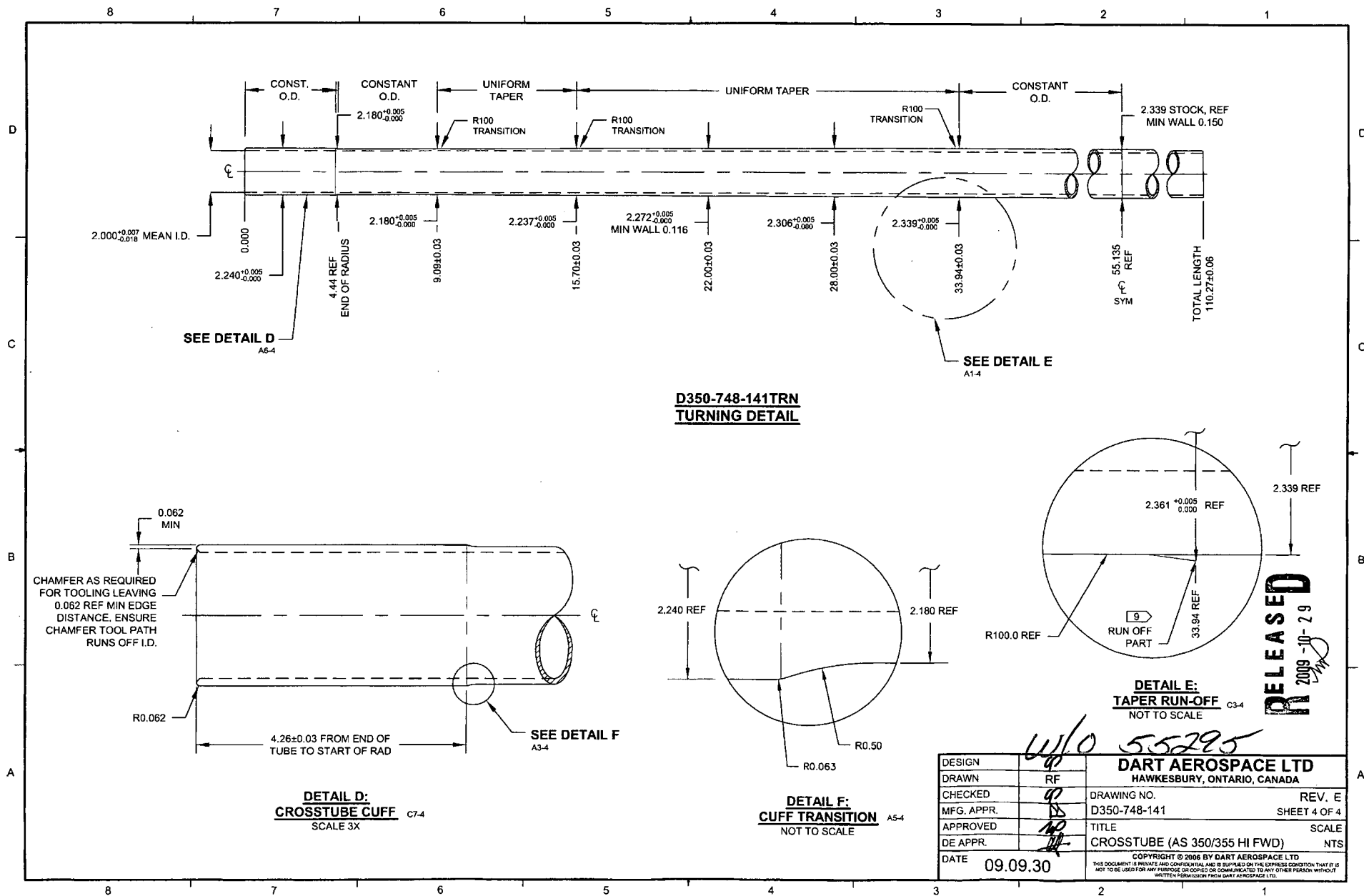
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GST No.: R105468102

OAK 119552-1

☒ HEAD OFFICE
1371 SPEERS ROAD, OAKVILLE, ONTARIO
CANADA L6L 2X5
TEL: (905) 827-4171 FAX: (905) 827-7489

☐ 2009 WYECROFT ROAD, UNIT B
OAKVILLE, ONTARIO
CANADA L6I 6J4
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☐ QUEBEC DIVISION
7450 RUE VÉRITÉ STREET, ST. LAURENT, QUÉBEC
CANADA H4S 1C5
TEL: (514) 334-4240 FAX: (514) 334-6269

05/19/2010

MM/DD/YYYY

PAGE: 1

1DAR01

BILL TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

SHIP TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

K6A 1K7

K6A 1K7

DATE SHIPPED	SHIP VIA	F.O.B.
05/19/2010		ORIGIN
CUSTOMER P/O No.	JOB No.	TERMS
PO11869		NET 30 DAYS

PART No.	DESCRIPTION	UOM	QTY ORD	QTY SHPD	TEST RESULTS
D350-748	-141 TRN CROSSTUBE	EA	12	12	
<p>Process Specifications: Procedure: 4353</p> <p>HEAT TREATED TO 180 KSI MIN. PER AMS 2759-1E</p> <p>100% HARDNESS CHECKED AS PER ASTM E-18</p> <p>40/45 HRC</p> <p>MATERIAL: 4130</p> <p>SAND BLASTED AFTER HEAT TREAT</p> <p>55294, 55295, 55296, 55297, 55298, 55299, 55300, 55301, 55372, 55373, 55374, 55375</p> <p>8 10/05/27</p> <div style="border: 2px solid black; padding: 5px; display: inline-block;"> <p>100% HARDNESS TESTED</p> <p>12 pcs.</p> <p>42/43 HRC</p> </div> <p>27 VALO TH. 25 Q.C.</p>					

I hereby certify that the material covered by this release note has been inspected and tested and conforms to all specifications relevant thereto in accordance with the conditions of the contract / or purchase order.

ON BEHALF OF VAC AERO INTERNATIONAL INC.



Anna Robinson
Authorized Q.C. Inspector



VACUUM BRAZING · HEAT TREATING · SPECIAL PROCESSING · FURNACE EQUIPMENT
TURBINE COMPONENT OVERHAUL · PLASMA AND OTHER COATINGS